

## THE SYRPHID GENERA HAMMERSCHMIDTIA AND BRACHYOPA IN CANADA.

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In presenting the present paper the author must offer apologies for its evident incompleteness, as it has been found impossible in the short time available to complete the drawings so necessary to illustrate the distinctive characters in a genus which is evidently somewhat confusing. A paper on the genus *Sphagina* was practically completed, with the necessary drawings, when it was learned that Dr. C. L. Metcalf already had a paper prepared on this genus, and it was therefore decided to review the genera indicated in the title, in so far as they are known in North America, with especial reference to the Canadian species.

According to my observations it is essential, in dealing with the majority of genera of *Syrphidæ* which occur in Canada, to include practically all the North American species, in any discussion which relates to their classification. For this reason the scope of the present paper is larger than the title may indicate.

Both *Hammerschmidtia* and *Brachyopa*, as genera, cannot be looked upon as well represented in most collections, although it seems that none of the species can be regarded as actually rare, and are, with the exception of *B. gigas*, probably of general distribution, and occur over the greater part of the United States and Canada. In Ontario I have records of six species of *Brachyopa* and one species of *Hammerschmidtia*. While the genitalia are not discussed in the present paper, they have been studied, and in every case bear out the apparent specific limitations.

### **Brachyopa** Meigen.

Medium sized flies; head narrower than the thorax; face moderately produced downwards and forwards, concave, not tuberculate; antennæ short, third joint oval, rarely more roundish; arista basal, bare, pubescent or short plumose; eyes touching for a greater or less distance, bare; front in female narrowed above. Thorax a little narrowed in front, usually with some stouter hairs on the meospleuræ

above, on the postalar callosities and on the margin of the scutellum, which is rather large, squarish or more or less triangular. Abdomen roughly triangular in shape, broader, and not much longer than the thorax, broadest at the second segment, thence quickly narrowing to the apex, but less so in the female. Legs simple, the femora a little strengthened, and usually with short bristles below, especially the hind pair. Wings longer than the abdomen, anterior cross-vein before the middle of the discal cell, first posterior cell ending in an acute angle near the apex of the wing. Squamæ of medium size.

#### GENERIC RELATIONSHIP AND LIMITATION.

It seems that this genus cannot really claim close relationship to other genera found in North America, although certain characters indicate a common origin with several genera. In Europe it is even more isolated. I cannot agree that *Hammerschmidtia* is very closely related, because in that genus the wing venation is quite distinct, the face bears a distinct tubercle in the male, the tibiæ are all armed with spines, as are the femora, and the thorax and scutellum bear strong bristles. The fact that both may possess plumose arista does not constitute a close affinity.

It is perhaps as well to clear up the question of these two genera here. I would distinguish between them as follows: In *Hammerschmidtia* the abdomen is slender, twice as long as the thorax; the face is tuberculate in the male; thorax armed with very evident spines; the legs are armed with spines and the anterior four tibiæ terminate in a row of bristles; the first posterior cell is not acute, and ends well from the apex of the wing. In *Brachyopa* the abdomen is triangular, only a little longer than the thorax, the face is concave in both sexes, the thorax has sometimes very small bristles, the legs may have spines below the femora, but not elsewhere; the first posterior cell is acute and ends near the apex of the wing. Thus it will be seen that even leaving the plumosity of the arista out of consideration, there are ample grounds for separating the two genera.

The genus which appears to be most closely allied to *Brachyopa* is *Chalcomyia*, notwithstanding the separated eyes in the latter genus. The shape of the abdomen is very similar, the eyes of several species of *Brachyopa* are not actually contiguous, the facial profile is more similar, and the wing venation is identical. Moreover, I have taken representatives of both

genera together, and both occur early in the season. *Myiolepta* is probably closer to *Brachyopa* than is *Hammerschmidtia*, as is demonstrated by the maculation of the wings, the venation, and the facial profile of the females, but it differs in having the slender abdomen, as in *Hammerschmidtia*, except in *M. bella* Will., from the Pacific coast.

#### BIOLOGY.

I have not observed the immature stages of any species of *Brachyopa*, but according to Lundbeck, they are fairly well known. In *Diptera Danica*, part v, pp. 386-7, Lundbeck deals extensively with what had previously been published regarding the developmental stages. The conclusion arrived at (and bearing his own observations) is as follows: That the larvæ live in sap exuding from trees; the eggs are laid in the spring of the year, and the larvæ pass the summer feeding upon the sap, and hibernate in the autumn; pupation takes place in the spring, and the life cycle is completed with the emergence of the adult; there is only one brood. That this applies to the American species is borne out by what has already been published on the subject, and also by my own observations regarding the occurrence of the flies.

#### HABITAT AND HABITS OF THE ADULTS.

Both Verrall (*British Flies*, Vol. VIII) and Lundbeck state that the adults occur about exuding sap, upon which they apparently feed. While I have never observed them in such places I must say that the woods in which I found them so abundant in 1921 was in process of extermination, and hundreds of tree trunks were exuding sap. Muscids were swarming around these when I examined them in April in the hope of finding *Merapioidus villosus*. Also in the other woods where I took specimens many trees had exuding sap.

The species of *Brachyopa* all occur early in the season and specimens taken after the middle of June in Ontario must be looked upon as unusual captures. During 1921 I was able to do considerable collecting during May and June, and collected on Wild Plum and several species of Wild Cherry for the first time, which resulted in many things new to me, including six species of *Brachyopa*, one of which proved to be undescribed. The first specimen was captured on May 4th,

and was teneral. It was taken on wild black cherry. I had observed several specimens on plum blossom in a neighbor's garden about a week earlier. It is therefore safe to say that specimens may be looked for from the time plum begins to bloom, until towards the latter part of June. Choke cherry bloom followed the black cherry, and while not as productive, a stray specimen was taken. The vast majority, however, were taken in open, sub-swampy woods on bloom of *Asmorrhiza clatoni*, and in a single hour I captured over forty specimens, including four species. Where they appeared from so suddenly I cannot imagine, as I had collected in the same spot for several days previously without a sign of one. This was in June, and by the 14th they had disappeared entirely, having been present for less than a week.

The adults are rather peculiar in habit, and invariably appear to arrive on a blossom from nowhere. Only one specimen was observed arriving on bloom and it appeared to fly quickly, and settle solidly at once and commence feeding. They are diligent feeders, and hence are usually easy to capture. Unlike *H. ferruginea*, they frequently are found high up on a tree.

#### DISTRIBUTION.

In Ontario I have taken six of the ten known species, and in view of the fact that some of these are recorded from the Pacific coast, while others are supposedly more or less southern, I conclude that all the species may be expected to occur at least in the northern States and Canada, with the exception that *B. gigas* Lovett probably occurs only in the Rockies and west. *B. media* was described from California, but occurs in Ontario, while *B. notata*, originally described from New Hampshire, occurs in British Columbia, Oregon and Washington Territory.

#### CHARACTERS USED IN CLASSIFICATION.

Several of the characters which might be used in classification are not employed here because they are often open to dispute and may cause confusion. One such character is the pilosity of the arista, which may vary somewhat in the same species, as is the case in the British Columbia specimen of *B. notata*, which has the pile distinctly longer than in any of the eastern specimens which are before me. While the structure of the

genitalia in the male is of great importance and of unusual value in this genus, as has been explained, they are not employed in the descriptions, as it is my belief that they must be demonstrated by means of drawings to be of greatest value, especially when the use of this character is still in its infancy.

The characters chiefly used are the color of the thorax and abdomen, and it may be safely said that this is sufficiently stable to permit of identification with certainty; and moreover, the structure of the hypopygia bears out the specific limitations in every case where I have males. I am therefore able to state that at present the only species of which there might be any doubt are *B. media*, *flavescens* and *rufiabdominalis*, all of which are closely related to *B. bicolor* of Europe. I do, however, believe the species mentioned above to be distinct, although one of the American species may be *B. bicolor*. Dr. Johnson\* also remarked upon the constancy of the thoracic lines and abdominal coloration. It frequently happens that the terminal abdominal segments may appear darkened, but this is due to internal coloration and not to the pigmentation of the chitinous material.

TABLE OF SPECIES.

- 1. Second and third abdominal segments with posterior pollinose bands.....2.  
 Second and third segments without such bands.....3.
- 2. Thorax with anterior median darker stripes and interrupted sublateral stripes; all the abdominal segments with roundish shining spots on each side. (Length about 5 mm.).....*cynops* Snow.  
 †In addition to the stripes as in *cynops*, the thorax with a roundish spot at inner ends of the suture and a slightly oblique stripe on each side posteriorly, second and fourth segments entirely shining anteriorly,  
*diversa* Johns.
- 3. Abdomen entirely black.....*daecke* Johns.  
 Abdomen ferruginous, yellowish, or partly yellow.....4.
- 4. Last two or three segments shining black; second segment chiefly translucent yellowish.....*vacua* O. S.  
 Abdomen not so maculated.....5.
- 5. Abdomen with median longitudinal stripe, interrupted before the sutures or entire; or arista distinctly plumose.....6.  
 Abdomen without median longitudinal stripe.....8.
- 6. Thorax grayish black or slaty; abdomen luteous.....*perplexa* Curr.  
 Thorax ferruginous or yellowish red.....7.
- 7. Thorax and abdomen ferruginous (about 10 mm.).....*gigas* Lovett  
 Thorax more yellowish red, with lighter stripes; color of abdomen more clear yellow (8 mm.).....*notata* O. S.
- 8. Thorax reddish yellow; at any rate not at all blackish on the posterior half.....*flavescens* Shan.  
 Thorax blackish.....9.
- 9. Eyes narrowly separated, most nearly contiguous near the ocelli,  
*rufiabdominalis* Jones  
 Eyes distinctly contiguous, the vertical triangle long and narrow.....*media* Will.

\*Can. Ent., Vol. XLIX, p. 361, (1917).

†The character of most importance here is the color of the abdomen. Snow's description of thorax was incomplete.



***Brachyopa cynops* Snow.**

Length 5 mm. Female. Head light yellowish brown, largely concealed beneath glistening pollen; the shining ground color shows just above the antennæ and in a stripe on the cheeks, extending from the eye to the mouth opening. Antennæ wanting. Dorsum of thorax brown, covered with grayish pollen, anteriorly with two approximated linear blackish stripes; laterally with a broad interrupted stripe. Scutellum light brown, with yellowish pollen. Abdomen but little longer than broad; yellowish gray pollinose; second segment with a circular brown spot on the anterior corners; the two following segments are marked with corresponding elliptical spots, and, in the middle anterior border with a triangular spot; on the fifth segment are two small round spots. Legs uniformly reddish brown, with light colored pollen and short whitish pile. Wing hyaline, distinctly clouded at anterior cross-vein, on the veins at the anterior outer corner of the discal cell and on the ultimate section of the fourth vein; posterior cross-vein about as long as the ultimate section of the fourth vein, the included angle obtuse. One specimen, Colorado. (Snow).

Snow does not state the sex, but the figure is that of a female; also the figure shows the posterior oblique stripes on the thorax as in *diversa*, but not the spot inside the suture.

***Brachyopa diversa* Johnson.**

Abdomen with grayish yellow pollinose posterior bands, the second segment chiefly pollinose.

Length, 6 to 8 mm. Male. Face and front brownish red, covered with whitish pollen which leave the oral margin in front, a spot above the antennæ and a stripe on the cheeks, shining brownish. Antennæ brownish red, the first joint darker, shining. Vertical triangle blackish, with short brown pile; posterior orbits brownish red, pollinose, with whitish pile. In profile the face is concave above, a little convex below, prominent below, and moderately produced downwards. Eyes practically touching, the vertical triangle long and narrow. Dorsum of thorax grayish pollinose, leaving shining brownish stripes as follows: a median pair on the anterior two-thirds, an interrupted stripe on each side of these, and the sides of the dorsum, a slender median one in front of the scutellum, slightly oblique ones running from the corners of the scutellum to just outside the ends of the antero-median stripes, and a spot on the inner ends of the suture. Pleuræ brownish red, with lighter pollen. Pile of the dorsum black, but with yellowish pile between the humeri and across the posterior margin; pleuræ with yellowish pile, a cluster of black hairs on the upper part of the mesopleuræ. Scutellum reddish, yellowish pilose, with a few longer, but not bristly hairs on the margin. Abdomen shining black, the first and second segments grayish yellow pollinose; second segment with a median longitudinal line, not reaching the posterior margin, and an oval spot, reaching the sides, on the anterior portion, shining black; third and fourth segments shining

black, with the hind margins grayish yellow pollinose, the pollen extending forward in the middle to the anterior third, but there is a roundish notch centrally in front, corresponding to the median stripe on the second segment. Hypopygium yellowish red. Abdomen with light yellow pile, longer basally. Legs black, anterior four trochanters, tips of the femora, the anterior ones beneath apically, basal third of tibiæ, tips of the tibiæ and tips of the tarsal joints, luteous or yellow. Wings slightly yellowish anteriorly, the veins all a little crowded, the region of the anterior cross vein and a streak between the spurious vein and the fourth vein beyond the cross-vein, brownish; wings more yellowish basally.

Female. Front golden yellow pollinose, leaving the ocelli and a streak in front shining black, a large area above the antennæ, cut off truncately above, and the face below, on the sides, shining yellowish, although the lower part of the face is slightly pubescent. The pollen on the thorax and abdomen is more yellow; fifth abdominal segment yellow pollinose, except an anterior broadly interrupted cross-band; third antennal joint broader, a little darker.

Description drawn from 9 specimens, taken at Orillia on May 5th to 18th, 1921.

This species is easily distinguished from the preceding by the less pollinose abdomen, as the anterior half of the median segments is wholly shining, whereas in *cynops* there are very distinct oval shining spots on the anterior angles, the balance of the segment being shining.

#### *Brachyopa vacua* O. S.

Abdomen with the second segment pallidly yellowish, the apical segments shining blackish.

Length, 7 to 9 mm. Male. Face and front of a dirty yellowish color, clothed with whitish pollen, which leaves a brown stripe on the cheeks and an area above the antennæ shining. Antennæ colored as the face, arista black, and almost bare. Vertical triangle long, the eyes touching for only a short distance, a distinct median groove in front of the ocellar triangle, which is brownish; occiput with grayish pollen and head with entirely pale pile. Dorsum of thorax obscured by grayish yellow pollen, which leaves the usual double median stripe, an interrupted stripe on each side and a spot above the wings, brownish. The pleuræ are ferruginous, the sternum blackish, but thickly whitish pollinose. Pile of thorax yellowish on the dorsum, whitish on pleuræ. Scutellum luteous yellow, subtranslucent, squarish, with short, white pile. First abdominal segment brown, the anterior angles yellowish, the whole whitish pollinose; second segment except the apical sixth, the lateral margin posteriorly and a median dash, usually not reaching the black posterior border, shining yellowish. The rest of the abdomen, except the small anterior angles of the third segment, which are yellowish, shining brownish black. Pile wholly white. Legs brownish, the femora thinly

whitish pollinose; coxæ, trochanters and bases of the femora narrowly, tips of the femora, bases of the tibiæ and their tips and the first one or two tarsal joints more or less yellowish or luteous. Hind femora a little produced beneath near the end. Wings a little darkened, yellowish basally.

Female. Similar. Front, except the shining yellowish area above the antennæ which is thinly whitish pollinose, brownish, and with reddish brown or grayish pollen. (Neither of my specimens have the front as light colored as indicated in Osten Sacken's description.) One male has the narrow, irregular anterior margin of the third abdominal segment yellow, and the thorax a little more brownish.

It is probable that the type specimen was teneral. The species was originally described from Quebec, but since that time, except for a single specimen recorded by Williston from California, it has apparently not been recorded. The above description is drawn from eight specimens taken at Orillia, May 4th to 30th, 1921.

This species cannot well be confused with any other in the genus.

#### ***Brachyopa daeckei* Johnson.**

"Length, 6 mm. Front black, grayish pollinose, a shining spot above the base of the antennæ, yellow, bordered with black; face below the antennæ grayish pollinose, sides shining, yellow, with two spots of black, antennæ dark yellow, arista brown. Thorax black, grayish pollinose, with five sub-shining lines, the three inner ones slightly diverging, but not reaching the scutellum. Pleuræ brownish grayish pollinose, scutellum brown, the apical half much lighter than the base. Abdomen black, shining, hairs white. Legs brown, hairs white, outer half of the posterior femora blackish, tarsi yellowish; halteres yellow. Wings hyaline, veins brown, stigma yellow, anterior cross-vein slightly clouded with brown, tegulæ white.

"One specimen, Castle Rock, Delaware County, Pa., May 19, 1902, collected by Mr. V. A. E. Daecke. This specimen has been referred to as a dark variety of *B. media* (Psyche, Vol. XVII, p. 230, 1910) but further study in connection with the following species convinces me that it is distinct." (Johnson).

#### ***Brachyopa rufiabdominalis* Jones.**

"Length, 7 mm. Face light reddish brown, prominently produced forward, with light, silvery, glistening pollen and very fine white pubescence; slightly concave beneath the antennæ; frontal triangle shining, prominent, with or without a median suture. Cheeks a little darker red than the face and with a shining stripe from the eye to the oral margin; sparsely covered with long white pile. Antennæ situated on a semi-conical projection, of the same general color as the face, but slightly darker; first joint about half as long as the second, of a slightly



deeper red than the third, dorsally, with a tuft of black hairs on each joint; third joint light red, about as long as the first two together, ovate; arista basal, bare. Vertex black, frontal portion with or without silvery pollen, eyes narrowly separated. Dorsum of thorax brown, with black pile, covered with grayish pollen, anteriorly with two approximate dorso-medial blackish stripes, laterally with a broad interrupted stripe; the transverse suture deep, shining; humeri with a reddish spot; pleuræ reddish brown; a reddish brown stripe extending from the scutellum to the base of the wing. Scutellum light reddish brown, beset with blackish and reddish pile, shining, with a very narrow median light stripe; abdomen slightly longer than the thorax, but little longer than wide, light reddish brown and entirely shining, with reddish pile; the posterior portions of segments one, two and three with a posterior shining, brownish, transverse band, either entire or interrupted in the middle. Legs of the same color as the abdomen, principally with light colored pile, on the under side of the hind femora and the apex of the anterior four femora with stout black pile; tarsi darker brown, light at apex; hind basitarsi slightly thickened at base and thence gradually tapering to apex. Wings hyaline with a reddish tinge, anterior cross-vein before the middle of the discal cell and almost rectangular. (Colorado). (Jones).

"*B. rufiabdominalis* differs from *B. cynops* in that the scutellum and abdomen are entirely shining, etc. Differs from *B. bicolor* of Europe in that the occiput of the latter is pale gray and with gray pile, the face is without pubescence, the eyes touch for about one-third the distance from the ocelli to the antennæ; the scutellum has eight long marginal hairs and is covered with short black pile, while in *rufiabdominalis* the occiput is black, whitish pollinose and has black and whitish pile; the face has fine whitish pubescence on it; the eyes are distinctly separated, the nearest point of contingency being immediately below the ocelli; the scutellum has black pile dorsally, and the remainder is covered with reddish pile and lacks the eight black marginal bristles." (Adapted from Jones). For further remarks see *B. media* Will.

#### *Brachyopa media* Will.

Small, dorsum of thorax blackish or slaty, abdomen reddish yellow, the hind borders of the segments narrowly brownish; front in female brownish.

Length, 6 to 7 mm. Male. Face and front reddish yellow, the cheeks and most of the frontal triangle shining, elsewhere whitish pollinose. Antennæ reddish yellow, arista black, its base reddish. Vertical triangle long, narrow, the eyes touching for only a short distance; occiput brownish above. Dorsum of thorax blackish or brownish black, the sides usually reddish, covered with whitish yellow pollen, leaving a median double stripe, and an interrupted stripe on each side, brownish; humeri yellowish; pleuræ reddish brown above, brownish below, thinly whitish pollinose. Scutellum reddish yellow. Pile of thorax and scutellum yellowish, on the pleuræ whitish. Abdomen

reddish yellow, more reddish apically; second, third and fourth segments and their lateral margins, except anteriorly, very narrowly brownish or reddish brown; pile short, yellowish. Legs yellowish, including the coxæ; hind tibiæ with a slightly darker pre-apical band; hind tarsi brownish. Wings very slightly darkened with luteous, the tip a little blackened.

Female. Face shining, except below the antennæ; front blackish above, whitish pubescent except a median longitudinal shining stripe connecting with the shining area above the antennæ; pollen of the thorax more whitish; wings almost hyaline; legs somewhat paler. Otherwise as in the male.

*B. media* was originally described from California from a single female specimen. I have before me a female from Teulon, Manitoba, May 15, 1920, and two males taken at Orillia, Ontario, on May 30, 1921.

The specimens described above agree perfectly with Williston's description and I consider them absolutely typical. *B. rufiabdominalis* agrees fairly well with the above description, but the color appears to be darker and the eyes are narrowly separated and approach each other near the ocelli which would make the vertical triangle short, while in *media* the vertical triangle is long and the eyes touch nearer the antennal base than the ocelli. The only other species which is really confusing is *flavescens*, which has a wholly pale thorax (Johnston says the thorax may be brown before the suture) and a yellowish front in the female. The face is also more concave. I believe these three species are abundantly distinct, but a large series of all the species, and a comparison of the male genitalia will be necessary to definitely determine this point. A comparison with *B. bicolor* is necessary. Strangely enough Jones did not even mention *media* in establishing his *B. rufiabdominalis*, which seems rather strange in view of the fact that only the female of the former had been described.

#### **Brachyopa flavescens** Shannon.

Thorax wholly reddish yellow (or brownish before the suture—Johnson); abdomen with narrow posterior segmental margins brownish.

Length, 3.75 to 6 mm. Female. Face, except below the antennæ, lower part of the front, and a slender median frontal stripe, shining reddish yellow; front yellow pollinose, face with whitish pollen except where shining. Occiput above darkish, with whitish pollen; face a little more concave than in *media*. Thorax wholly reddish yellow, with the usual stripes shining. Abdomen reddish yellow, the narrow posterior margins of the segments brownish, their lateral margins

very narrowly or obscurely brownish on their posterior half. Legs yellow; hind femora, sub-base and preapical band on hind tibiae and the hind basitarsi and last segment, brownish or darkened. Wings hyaline.

"Male, rather robust, small, yellowish, eyes strongly contiguous; vertex yellowish gray, with pale, very short pile; vertical triangle narrow and acute, reaching forward to about the middle of the eyes; frontal triangle yellow, bare. Antennae orange-yellow; third joint ovate, longer than broad; arista darkened distally and with very fine microscopic pubescence along its entire length. Face moderately produced, light yellow, dusted with white and with fine white hairs, the lower half produced and truncate, its upper angle slightly acute. Mesonotum dark ocher yellow, dusted with brownish gray, at the sides and behind, broadly ferruginous and more shining; two narrow and approximated stripes medianly on the anterior two-thirds, two broad, anteriorly and posteriorly abbreviated stripes outwardly, hairs rather short and dense, yellow. Pleurae brown and black, thickly dusted with gray; mesopleurae with somewhat longer hairs than those on mesonotum. Scutellum convex, broadly rounded, much broader than long, shining ocher yellow, rather evenly punctured, with light yellow hairs and a few bristle-like ones on the posterior margin. Abdomen much broader than thorax, broadest at posterior margin of second segment; color light yellow, more or less stained with dark by body contents; second segment more or less translucent. Coxae yellow. Anterior and middle pairs of legs yellow, with white pile. Hind pair somewhat darker, the femora distally tinged with brown and with minute black spines along ventral surface; tibiae tinged with brown on distal half; first tarsal joint grayish brown, paler distally and ventrally. Wings hyaline, faintly smoky, without trace of maculation, slightly darkened distally along anterior margin; stigma yellow. Halteres pale yellow." (Shannon).

The species has been sufficiently discussed under the preceding species. It has been reported from Fairfax County, Virginia, (type locality), Massachusetts and New Hampshire (Johnson), and I have two female specimens from Orillia, Ontario, taken by myself, May 5th and 21st, 1921. The description of the female given here is made from local specimens, while the description of the male is that of Shannon.

#### ***Brachyopa perplexa* Curran.**

Closely related to *B. notata*, but arista not as pubescent and epistoma more produced; larger than *B. media* and with black abdominal markings, and the median longitudinal black line practically complete.

Length, 6.5 to 8.5 mm. Male. Face and front pale yellow, thickly covered with white pollen, the cheeks and frontal triangle, except narrowly next to the eyes, shining; a brownish or ferruginous stripe from the eyes to the oral margin; occiput below shining ferruginous,

but above and near the eyes, grayish pubescent. The face is considerably produced downwards and forwards; in profile moderately concave from the antennal base to the prominent oral margin. Antennae reddish yellow, third joint longer than broad, its lower end more pointed, not large, arista brownish, slightly noticeably pubescent. Vertical triangle and a narrow V on the occiput behind the ocelli, grayish yellow (sub-golden) pollinose, the ocellar triangle shining brown. Pile of the head: A few pale hairs on the cheeks, posterior orbits with long pale pile below, and short black pile arranged in definite rows above. Thorax reddish brown, the sternum more blackish, but covered with grayish pollen. Disc of the dorsum grayish pollinose, leaving four stripes of a dark reddish brown or blackish, the median ones very narrowly separated and expanded posteriorly to unite with the sub-lateral bands, which are also entire; the opaque area is strictly confined to the disc. A darker, thickly black pilose opaque stripe runs from the postalar callosity to the suture; dorsum of thorax with short black pile, the pleuræ with longer, white pile. Scutellum brownish yellow, with short black pile, with a few longer, bristle-like hairs apically. Abdomen: First segment black, its anterior border yellow; second segment pale yellow to slightly reddish yellow, with a median longitudinal black stripe narrowly separated from the anterior margin, and often joined to the black posterior margin or slightly separated from it (the mark is ! shaped, without the dot below); hind border narrowly black and sides of segment, except anteriorly, black; third segment similar, darker colored, but the median stripe entire and the lateral margins usually entirely blackish; fourth segment similar, but the lateral margins more brownish. Hypopygium yellowish red. Pile of abdomen fine, whitish, except on the apical half of segments two and three, where it is black. Legs reddish brown; tarsi all brown or blackish, except that the first three joints are yellow apically; hind femora darker on apical quarter; hind tibiæ darker, with a pale median band; anterior four tibiæ sometimes darker apically. Wings slightly yellowish tinged, stigma pale luteous. Squamæ clear white, with white pile. Halteres slightly yellowish. In somewhat teneral specimens taken in early May the abdominal markings are more brownish, and in fully mature specimens the abdomen may be more reddish, and is always wholly shining. The thorax may be slightly darker or paler than described.

Female. Averages .5 mm. smaller than the male. Face a little more deeply excavated; front shining ferruginous with a very narrowly interrupted whitish pollinose band below the middle; stripe on the cheeks only a little darker than facial color or concolorous; median abdominal stripe broader, complete on second, third and fourth segments; transverse bands broader and successively narrower apically; fifth segment yellowish ferruginous with the narrow hind border blackish and the lateral margins ferruginous or brownish. The general color is more ferruginous than in the male.

*B. perplexa* is evidently widely distributed, but it is impossible to state its distribution owing to its confusion with



*media* and *notata*. Altogether I took over sixty specimens at Orillia in 1921, between May 8th and June 14th. I have also specimens from Maine (C. W. Johnson).

*B. perplexa* differs from *notata* in shorter pile on arista, dark thorax and abdominal markings, paler general ground color, more produced face, and unclouded wings. It is at once distinguished from *media* by the presence of the median line. From *gigas* it is readily distinguished by its darker thorax, smaller size, and less pilose arista. Dr. Johnson had also this species before him when he discussed *B. media* (Can. Ent., Vol. XLIX, p. 362) as is quite evident from his remarks, and I have two males received from him, as *B. media*.

#### **Brachyopa notata** Osten Sacken.

Arista short plumose; thorax yellowish red; abdomen with an interrupted median stripe.

Length, 5.5 to 7 mm. Male. Face and front yellow, whitish pollinose, leaving the frontal triangle chiefly, and a broad stripe on the cheeks shining ferruginous. Antennæ reddish yellow, third joint elongate oval, more pointed below; arista reddish, short plumose; vertical triangle tinged with brownish, with very short brownish pile; eyes touching for almost the same length as the vertical triangle; posterior orbits dull yellow, with whitish pile. Thorax yellowish red, thinly whitish pollinose, leaving a shining double median stripe and sub-lateral stripe, interrupted at the suture, and the margins of the dorsum, shining. Pile of dorsum black, but whitish between the humeri. Pleuræ with yellowish pile, the long hairs on the upper portion of the mesopleuræ may be more or less blackish, although usually all pale. Scutellum triangular, the apex rounded, lighter colored than the thorax, with black pile and some slightly longer marginal hairs. Abdomen yellow or reddish yellow; all the segments with a narrow brown posterior border, which is continued forward on the sides of the segments to near the anterior angles. In the middle, the second and third segments with a longitudinal dash of brown, not reaching the posterior brown margin; sometimes a small spot on the fourth segment. Pile of the abdomen pale yellowish, but black on the posterior half of segments two and three. Legs reddish yellow, the last two tarsal joints brown; anterior basitarsi, hind basitarsi with the two following joints, more brownish. Legs chiefly short stout pilose, the femora with stiff hairs below. Wings tinged with luteous or yellowish, the stigma luteous; a dark cloud follows the border of the wing from the stigma to the tip of the fourth vein, a distinct spot at the end of the fifth vein, and the region of all the veins dilutely clouded.

Female. Front only a little narrowed above, dull yellow; a large shining spot above the antennæ; ocellar triangle brownish; pile of front



brownish; third antennal joint oval, larger than in the male; markings on thorax more distinct; abdominal markings a little broader, the median stripes complete. Legs a little darker, wings with more distinct clouds.

In some specimens the terminal segments may appear brownish. This condition is not natural, but is caused by internal organs, or staining.

*B. notata* has been reported in Canada from Ottawa, Ont. I have a male before me from Ottawa, a male from Vancouver, B. C., a pair from Orono, Maine, and a pair from White Mountains, N. H. Likely to be confused only with *perplexa*, from which it is readily distinguished by its pale thorax, more distinctly maculated wings, etc. The male from British Columbia appears to be teneral, and the median stripes are very faint, practically wanting and the fourth segment has no brown hind margin, but the sides are narrowly brownish. The color is a little paler yellow, but darker than in most specimens of *flavescens*, from which it is readily distinguished by the larger scutellum and distinctly plumose arista.

#### **Brachyopa gigas** Lovett.

The largest known species in the genus; arista very distinctly plumose; thorax ferruginous yellowish; abdomen of same color, with four darker stripes.

Length, 10 mm. Male. Face and front yellow, whitish pollinose, the cheeks and the greater part of the frontal triangle, shining, darker; face produced downwards and forwards. Antennæ reddish yellow, third joint elongate oval, flattened above on the apical third or more, making the end appear more pointed below; arista brown, its base yellow, short, sparse plumose, but longer than in other species. Vertical triangle brown, with mixed yellow and brown pollen and short brown pile; occiput shining below, gray pollinose above, and with light colored pile. Eyes touching for moderate distance. Thorax ferruginous reddish, with a median double stripe and an interrupted stripe on each side, reaching quite to the scutellum, more brownish; a brown spot behind the front coxæ. Scutellum concolorous with thorax. Pile of the thorax and scutellum black, across the front between the humeri and the sides of the dorsum and corners of the scutellum with yellow pile. Abdomen ferruginous reddish, all the segments with brownish posterior margins, and the lateral margin entirely narrowly bordered with shining brown; second to fifth segments with an elongate median dash in front, brownish. Legs yellowish brownish, the last two tarsal joints brown. Wings yellowish in front, the stigma yellow.

Originally described from Washington State from a single male. According to Lovett and Cole there are several specimens

in the Collection of Washington State College. The above description is made from two specimens from British Columbia, and there are three specimens in the Canadian National Collection from British Columbia.

A very distinct species by its large size and rather distinctive color. The arista is most conspicuously plumose, and the species would be included in *Hammerschmidtia* in Europe.

#### **Hammerschmidtia.**

The characteristics of this genus have been sufficiently dealt with under *Brachyopa*. The species discussed below is the type of the genus, and possibly the only representative.

#### **Hammerschmidtia ferruginea, Fallen.**

Length, 9 to 11 mm. Male. Head yellowish red, antennal base, a median facial stripe and the cheeks shining; in profile a little excavated below the antennæ, and a little below the middle with a longish tubercle, below which it is slightly retreating to the oral opening, or the face may be more excavated below the antennæ; it is considerably produced downwards. Antennæ shining yellowish red, arista black, its base reddish, plumose. Pile of occiput wholly yellowish. Thorax brownish, sometimes ferruginous, the side margins always ferruginous reddish, on each side of the middle with rather broad, posteriorly abbreviated grayish or silvery pollinose stripes. The pile is chiefly short, pale yellowish, but there are some longer, black, stout hairs behind the suture and on the darker stripes. There are bristle-like hairs on the mesopleuræ, in front of the suture at the side, above the base of the wings, on the postalar calli and the apex of the scutellum, which is reddish, with short black pile. The abdomen is very variable in color, but seems to be chiefly shining brownish with quadrate reddish or ferruginous spots on the anterior angles, occupying about half the length of the segment, and broadly separated, in mature specimens; or the spots may occupy most of the segment and form a complete anterior band, or the second segment may be entirely ferruginous. The fourth segment is usually all brown, except the anterior corners, but may be only brownish posteriorly in light colored specimens. The hypopygium is always light reddish to reddish. The pile is very short, blackish, except basally, on the anterior angles of the segments and on the hypopygium, where it is whitish and longer. The legs show the same variation in color from ferruginous brown to ferruginous, the hind legs always darker; four anterior coxæ reddish or yellow; hind tibiæ arcuate and paler basally; last two tarsal joints blackish. All the femora, which are a little thickened, the hind ones more so, are armed with short black spines beneath and long black bristles posteriorly and anteriorly; the hind tibiæ bear several short, stout bristles exteriorly, and all the tibiæ, the hind ones less prominently so, bear a terminal

fringe of black spines. The veins are all more or less clouded, more marked anteriorly; stigma brownish yellow.

Female Facial tubercle practically wanting; front reddish, a little shining, a shallow median groove extending between the ocelli and antennal prominence; indistinctly finely wrinkled, especially above; thorax lighter colored; abdomen more yellowish red, the darker areas more restricted and more ferruginous; legs paler. Pigment of the wings more blackish, and a little more extensive anteriorly. Possibly there is as much variation as in the male.

This description is drawn from 9 males and 1 female taken by myself at Orillia, May 18th to 30th. The species has been reported from Manitoba, B. C., Washington, and other places and is probably to be found over the whole of Canada and the northern States.

I do not think that *H. ferruginea* can be classed as a rare species, but it is most certainly not common in collections. This is, I think, due to the fact that its habits are not well understood. While it is true that it occurs in company with *Brachyopa* spp., it seems to have slightly different habits generally. I have found it more often on very low blooms of choke cherry, that is about two or three feet from the ground, but I took one specimen on bloom about eight feet up, and another specimen was taken on bloom in open sub-swampy woods. Another peculiarity is that I have never seen the species flying before four o'clock in the afternoon, but this may be due to the fact that my collecting in May was practically all done after two-thirty P. M.

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Since the above paper was prepared several additional specimens belonging to these two genera have been examined, including two additional new species.

#### ***Brachyopa cynops* Snow.**

I have examined the type of this species, and find it to be a female. The description covers all the essential points. The dorsum of the thorax is rusty yellow rather dull, the disc, occupying about half the width of the dorsum, black; the pollen is greyish yellow, not grey and the shining stripes are not distinct.

#### ***Brachyopa vacua* O. S.**

About thirty specimens from Kansas and Missouri show no differences from the description.

***Brachyopa rufiabdominalis* Jones.**

Three specimens of this species from Washington State. The color of the thorax is more slaty than in *media*, the third antennal segment is longer and larger. In the female the front is a little wider, the sides less parallel, more evidently dusted on the black portion and therefore appearing lighter in color. The legs are all reddish, the tarsi brownish red. Abdomen wholly rusty reddish yellow. I could not see that the eyes of the male differed greatly from *media*, but the chief difference seems to be in the fact that the abdomen entirely lacks any darker lines on the apices of the segments, more slaty color of the thorax and slightly larger size. My three specimens are all between 7.5 and 8 mm.

***Brachyopa notata* O. S.**

Five additional specimens from Washington State and Idaho. These agree with the specimen mentioned from British Columbia, and may be distinct. Two additional specimens from New York agree with the eastern specimens.

***Brachyopa perplexa*.**

Two additional specimens from New York State agree perfectly.

***Brachyopa gigas* Lovett.**

A specimen from Washington State and a second from Idaho.

***Brachyopa basilaris* n. sp.**

This species traces out to *notata* in the key. It is distinguished by the wholly red first two abdominal segments, the remaining segments being black. Female from Washington State.

***Brachyopa nigricauda* n. sp.**

Traces out to *dæcke* Johnson in the key. Distinguished from that species by the presence of six shining stripes on the dorsum of the thorax, more reddish pleuræ and humeri, more extensively yellow scutellum, yellowish wings and paler legs; the anterior tarsi are all blackish as are the two apical segments of the remaining tarsi.

The descriptions of these two species will be published in the Kansas University Science Bulletin during the current year.

I have also examined a male specimen of *Brachyopa bicolor* Fallen, from Europe and can say definitely that none of our North American species is conspecific.